THURSDAY, FEBRUARY 19, 1891.

REPTILIA AND BATRACHIA OF BRITISH INDIA.

The Fauna of British India, including Ceylon and Burma. Published under the authority of the Secretary of State for India in Council. Edited by W. T. Blanford. "Reptilia and Batrachia." By George A. Boulenger. (London: Taylor and Francis, 1890.)

MORE than a quarter of a century has passed since Dr. Günther's "Reptiles of British India"[1] appeared. Externally, it has little in common with the present book. Dr. Günther's work is large, and not very handy; but it is adorned with 26 plates, which, as unmatched gems of modern lithography, possess enduring artistic value. Mr. Boulenger's work, which may be taken as a sort of second edition of the older book, is a volume of moderate size, with a number of simply executed woodcuts, which, consisting for the most part of diagrammatic outlines, are intended merely to aid the student in comprehending the structure of the skull and pholidosis. In one respect, however, and that the most important, the two books have a remarkable resemblance to one another. Both trace new paths for the classification of the animals with which they deal.

While the herpetological fauna of the entire south-eastern continental part of Asia is treated in Dr. Günther's "Reptiles of British India," Mr. Boulenger limits himself in the present work to British India, with Burma and Ceylon. Nevertheless, the number of species described by Mr. Boulenger is considerably greater than that described by Dr. Günther. The Reptiles described include 3 Crocodilia, 43 Chelonia, 225 Lacertilia, 1 Rhiptoglossa, and 264 Ophidia; the Batrachia include 124 Ecaudata, 1 Caudata, and 5 Apoda.

Looking more closely at the rich contents of the book, we need not say much about the majority of the orders of Reptiles and Batrachia, because the systematic as well as the descriptive treatment of the families, genera, and species does not differ greatly from the results he has set down in his masterly British Museum Catalogues—results which are now the common property of the naturalists of all nations. The only new contribution, corresponding better to present scientific needs, is the separation of the chamæleons from the lizards, and the consequent division of the Squamata into the three sub-orders of the Lacertilia, the Rhiptoglossa, and the Ophidia.

On the other hand, the classification of the snakes, which comprise nearly one-half of the Reptilian species known to occur in India, appears to be completely new; and all the descriptions of families, genera, and species have been prepared expressly for the present work. As no recent publication contains a complete synonymy of the Ophidia, the author explains that somewhat fuller references to the literature of the subject have been rendered necessary than in the other sub-orders of Reptiles and Batrachians. He has abandoned the old primary division of snakes into poisonous and non-poisonous. This division he properly regards as unscientific; "and," he adds, "although adopted almost generally, it is in so far incorrect that a number of forms (Opisthoglypha) usually ranked as harmless are really poisonous, although their bite may be without effect on man and large animals." Experiments recently made by Peracca and Deregibus on Cœlopeltis, and by Vaillant on Dryophis, "have shown that these snakes are poisonous, and that they paralyze their small prey before deglutition." Mr. Boulenger regards it as probable that "all snakes with grooved teeth will prove to be poisonous, to a greater or less degree, as it is clear, *a priori*, that these grooved fangs are not without a function." He has therefore "abandoned this physiological character in dividing the Snakes into families. Poisonous as well as harmless forms are arranged under Colubridæ." The difference between channeled and perforated teeth proves, moreover, to be but one of degree, and the term "perforated" is anatomically incorrect. In both these types the author finds the structure of the teeth essentially the same; they are folded over so as to form a duct to carry the poisonous secretion; when the edges meet and coalesce, a perforated fang is formed; when they merely approach each other, the channeled form results.

The learned author cannot, unfortunately, suggest a criterion by which it might be possible to distinguish at a glance between harmless and poisonous snakes. We wish, however, he had referred to a point which is still involved in complete darkness. In British India, according to official reports, from 20,000 to 23,000 people die every year from snake-bite (20,067 in 1883; 20,142 in 1885; 22,134 in 1886); whereas in the French possessions in Farther India, and in the Dutch settlements in the Malay Archipelago, and in tropical Southern China, the deaths from this cause do not, in each, exceed ten in the year. Accurate statistics on the subject have been provided, especially by Dutch and German physicians in Java and Hong Kong. As the climatic conditions in all these countries are much the same, and as the frequency of snake-bite is not essentially different in the lands mentioned, and even many of the species (Naja, Bungarus, Trimeresurus) are alike, we have here a problem which has not yet been solved. To the present writer the number of yearly deaths from snake-bite in British India seems to be doubtful, and considerably exaggerated.

About 1500 species of snakes are known. Their systematic arrangement, as is well known, is extremely difficult. Mr. E. D. Cope's recent attempt in this direction[1] was not successful. Zoologists are much more likely to be satisfied with Mr. Boulenger's proposals. He arranges the Ophidia into nine families, viz. Typhlopidæ, Glauconiidæ (Menostomatidæ *olim*), Boidæ (including the Pythoninæ, Chondropythoninæ, and Boinæ) Ilysiidæ (for Ilysia and Cylindrophis), Uropeltidæ, Xenopeltidæ, Colubridæ, Amblycephalidæ, and the poisonous Viperidæ. Of these families and sub-families, those which are for the first time introduced into science are the Chondropythoninæ (Boidæ without præmaxillary teeth, but with a supra-orbital bone) and the Ilysiidæ (snakes with both jaws toothed, with transpalatine and coronoid present; præfrontals forming a suture with

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[1] "The Reptiles of British India." By Albert C. L. G. Günther. London: Published for the Ray Society by Robert Hardwicke, 1864. Fol.

[1] "An Analytical Table of the Genera of Snakes." By E. D. Cope. Proc. Amer. Phil. Soc., 1886, pp. 479–499.

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nasals; supratemporal small, intercalated in the cranial wall; vestiges of hind limbs), the latter a family which forms a passage from the Boidæ to the Uropeltidæ, agreeing with these in the physiognomy and scaling, with the former in the presence of vestiges of pelvis, whilst the skull is exactly intermediate.

The most interesting part of the book is that in which Mr. Boulenger divides and subdivides the family of Colubridæ. Of this, therefore, we may give a somewhat more detailed account. He divides this large family, containing the bulk of the Ophidia, into three parallel series:—

(1) Aglypha. All the teeth solid, not grooved. Harmless.

(2) Opisthoglypha. One or more of the posterior maxillary teeth grooved. Suspected, or poisonous to a slight degree.

(3) Proteroglypha. Anterior maxillary teeth grooved or perforated. Poisonous.

"In each of these series," says Mr. Boulenger, "we have a more or less perfect repetition of forms, due to adaptation to the various modes of life." Of the series represented in the Indian fauna, the Aglypha include the Colubrinæ and Acrochordina; the Opisthoglypha include the Dipsadinæ and Homalopsinæ; the Proteroglypha include the Elapinæ and Hydrophiinæ, all the former being adapted to terrestrial, all the latter to aquatic life. How deeply classification is affected by the new division here offered by Mr. Boulenger, we may see particularly in his record of the Indian genera of Colubrinæ, which we give, as a specimen, in the natural order:—Calamaria, Xylophis, Trachischium, Blythia, Aspidura, Haplocercus, Lycodon, Hydrophobus, Pseudocyclophis, Polyodontophis, Ablabes, Coronella, Simotes, Oligodon, Lytorhynchus, Zamenis, Zaocys, Coluber, Xenelaphis, Dendrophis, Dendrelaphis, Pseudoxenodon, Tropidonotus, Helicops, and Xenochrophis. Hitherto these genera have been included in the families and sub-families Calamariidæ, Lycodontidæ, Oligodontidæ, Colubridæ (with Coronellinæ, Trimerorhinæ, Colubrinæ, Dryadinæ, and Natricinæ), and Dendrophidæ; at least, therefore, in five different families. In how thorough a way the author has set to work in the limitation of genera also, we see from his combination of the genera Elaphis, Calopeltis, Cynophis, Compsosoma, Spilotes, and Gonyosoma in one great genus Coluber. The green, arboreal species referred to Gonyosoma stand in the same relation to Elaphis and Compsosoma as the green Ablabes (Cyclophis), Dipsas, or Trimeresurus to the other species of those genera. There can be no doubt that the phenomena can be more readily reviewed if these closely related forms are placed in one and the same genus than if genera or even sub-families are assumed, simply because some species have adapted themselves to arboreal or sub-arboreal habits, and have in consequence taken on a green colour. The group Acrochordinæ contains five genera—three with well developed ventral shields, viz. Stoliczkaia, from the Khási Hills; Xenoderma, from Java and Sumatra; and Nothopsis, from the Isthmus of Darien: two without ventrals, viz. Aerochordus, from the Malay Peninsula and Archipelago; and Chersydrus, from India to New Guinea. Mr. Boulenger deals with the Dipsadinæ in the same drastic manner. Of Indian genera, the following are placed by him in this subfamily: Dipsas, Elachistodon, Psammodynastes, Psammophis, Dryophis, and Chrysopelea—genera, therefore, which in the old classification were included in Dipsadidæ, Rhachiodontidæ, Psammophidæ, Dryophidæ, and Dendrophidæ. By devoting more attention than previous investigators to the structure of the skull and the dentition, to the number, form, and length of the teeth, and the form of the pupils, the pholidosis of the head, the structure of the scales, and the colour—to which, however, he does not attribute equal importance as a limiting principle—the author gives, it seems to us, a far better and more comprehensive arrangement than his predecessors. However, it cannot be denied that, satisfactory as the present attempt is, the problem of a systematic division of the *Colubridæ* is still far from being solved.

In the group of sea-snakes, Mr. Boulenger divides more sharply the genera Enhydris, Hydrophis, and Distira. The very differently formed dentition in these genera (in spite of their great resemblance in the form of the head, colour, and mode of life) seems to show that they have sprung from three different terrestrial genera, and that their present resemblances are only the result of their adaptation to their life in the water. Thus Platurus is to be regarded as a Hydrophid which may be traced as a direct descendant of the terrestrial Elapinæ.

Finally, Mr. Boulenger's work enriches science with a considerable number of new genera and species, especially in the sub-order of the Snakes; but space will not permit further reference to details. As the book will be indispensable to every naturalist and every layman who may wish to obtain information about the tropical Indian animal world, the few remarks we have given may suffice. The chief value of a work like this lies in its sharp diagnoses, and in its synoptical tables for genera and species, which enable the observer to determine with confidence the form which may be before him. The fact that the author gives a concise view of geographical distribution, and offers short biological remarks regarding some genera and even species, adds to the scientific importance of the work. For many years this will be the standard book for our knowledge of the Reptiles and Batrachia of India; and its moderate price ought to ensure for it a wide circulation both in India and in Europe. There are still many species about which we know little, and some of Mr. Boulenger's readers ought to be, and no doubt will be, stimulated to provide the desired observations and descriptions. The book should find a place in the luggage of every educated traveller who starts for India.

O. Boettger.

EDUCATION IN ALABAMA.

History of Education in Alabama, 1702–1889. By Willis G. Clark. (Washington: Government Printing Office, 1889.)

THIS volume forms one of the admirable series of historical monographs published by the Central Bureau of Education at Washington, and edited under the special supervision of Prof. Herbert Adams, of the Johns Hopkins University at Baltimore. It should be explained that in the United States there is nothing analogous to our Education Department, Congress and

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